

Serial No. 09/987,421

Docket No. MRE-0041

Amdt. Dated **June 29, 2004**

Reply to Office Action of December 31, 2003

Amendments to the Specification:

Please replace the paragraph starting on page 4, line 11 and ending on page 10, line 24 with the following paragraph:

To achieve the above object, there is provided a surface mounting device comprising: a plurality of transfers being moved in the X and Y axis directions ~~by~~ of an X-Y gantry installed on a base frame and supplying a printed circuit board for mounting parts or loading a discharged printed circuit by a head unit for sucking parts supplied from a parts supply unit and mounting the sucked parts on a printed circuit board; and a plurality of conveyers and being installed to be moved horizontally in a predetermined direction at a predetermined position on the base frame and carrying the printed circuit board supplied from the plurality of transfers to a parts mounting work position and discharging the same to the plurality of transfers when the mounting of the parts is finished.

Please replace the paragraphs starting on page 5, line 19 and ending on page 6, line 17 with the following paragraphs:

Fig. 1 is a perspective view of a surface mounting device according to the conventional art[[;]].

Fig. 2 is a plane view of a surface mounting device schematically showing the internal construction of the surface mounting device as illustrated in Fig. 1[[;]].

Fig. 3 is a plane view of a surface mounting device according to a first embodiment of the present invention[[:]].

Fig. 4 is a perspective view of the surface 5 mounting device as illustrated in Fig. 3[[:]].

Fig. 5 is a plane view of a surface mounting device according to a second embodiment of the present invention[[:]].

Fig. 6 is a perspective view of the surface 10 mounting device as illustrated in Fig. 5[[:]].

Fig. 7 is a view illustrating a parts mounting method using the surface mounting device according to the first embodiment of the present invention;~~and~~.

Please replace the paragraph starting on page 6, line 24 and ending on page 7, line 15 with the following paragraph:

Fig. 3 plane view of a surface mounting device according to a first embodiment of the present invention. Fig. 4 is a perspective view of the surface mounting device as illustrated in Fig. 3. As illustrated therein, the surface mounting device includes: a plurality of transfers 20 and 50 ~~being moved that move~~ in the X and Y axis directions ~~by of~~ an X-Y gantry 12 installed on a base frame 11 and supplying a printed circuit board for mounting parts or loading a discharged printed circuit by a head unit 13 for sucking parts supplied from a parts supply unit 14 and mounting the sucked parts on a printed circuit board (not shown); and a plurality of conveyers 30 and 40 being installed to be moved horizontally in a predetermined direction at a

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predetermined position on the base frame 11 and carrying the printed circuit board supplied from the plurality of transfers 20 and 50 to a parts mounting work position and discharging the same to the plurality of transfers 20 and 50 when the mounting of the parts is finished.

Please replace the paragraphs starting on page 12, line 8 and ending on page 13, line 21 with the following paragraphs:

The conveyer width adjusting rollers 31b and 41b are installed at a predetermined position of the conveyer guide frames 31a and 41a, the conveyer lifting members 31c and 41c are installed on the bottom of the inside thereof, and the conveyer driving units 31d and 41d are installed at an inner sidewall thereof. The conveyer guide frames 31a and 41a guide the carried printed circuit board, ~~and the~~ The conveyer width-adjusting rollers 31b and 41b are ~~may be~~ used for guiding the conveyer guide frames 31a and 41a when adjusting the width of the conveyer guide frames 31a and 41a according to the width of the printed circuit board. In case of mounting parts on the printed circuit board, the conveyer lifting members 31c and 41c lift/lower the printed circuit board at a predetermined height so that the head unit 13 can mount the parts. To mount parts, the conveyer driving units 31d and 41d generate the driving force for carrying the printed circuit board, which is then lifted/lowered to the a predetermined height by the conveyer lifting members 31c and 41c for the mounting of parts, and then lowered as the

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conveyor lifting members 31c and 41c are lowered when parts mounting is complete. By this driving force, the printed circuit board is moved along the conveyer guide frames 31a and 41a.

To receive the printed circuit board being moved along the conveyer guide frames 31a and 41a, the first horizontal driving device 32 and the second horizontal driving device 42 are installed respectively at the bottom of the conveyer guide frames 31a and 41a. As the first and second driving devices 32 and 42, a linear motor is used, which consists of movers 32a and 42a provided with armature coils 32b and 42b and stators 32c and 42c having a plurality of permanent magnets 32d and 42d arranged therein. The linear motor horizontally moves the conveyer guide frames 31a and 41a in a predetermined direction according to an electric signal supplied from a drive circuit 62 by control of a controller ~~61e-61~~ and arranges the ~~same~~ conveyor guide frames 31a and 31b in the width of the first transfer 20 and the second transfer 50. Here, the linear motor is one of a coil mover linear motor and a permanent magnet mover linear motor (not shown). Besides the linear motor, a ball screw driving device (not shown) or a timing belt driving unit (not shown) can be selected.

Please replace the paragraphs starting on page 14, line 8 and ending on page 15, line 1 with the following paragraphs

Fig. 5 is a plane view of a surface mounting device according to a second embodiment of the present invention. Fig. 6 is a perspective view of the surface mounting device as illustrated in

Fig. 5. As illustrated therein, the surface mounting device includes: a plurality of plane motion transfer units 70 and 80 being moved in the X and Y axis directions ~~by~~ of an X-Y gantry 12 installed on a base frame 11 and loading a printed circuit board moved in plane motion in a predetermine direction in order to supply or discharge the printed circuit board for mounting parts by a head unit 13 for sucking parts supplied from a parts supply unit 14 and mounting the sucked parts on the printed circuit board; and a plurality of conveyer units 30 and 40 being installed to be moved horizontally in a predetermined direction at a predetermined position of the base frame 11 and carrying the printed circuit board supplied from the plurality of plane motion transfer units 70 and 80 to a parts mounting work position and discharging the same to the plurality of plane motion transfer units 70 and 80 when the mounting of the parts is finished.

Please replace the paragraphs starting on page 16, line 7 and ending on page 16, line 25 with the following paragraphs:

In this construction, the operation of transfer guide frames ~~71~~ 71a and 81a, a plurality of transfer rollers 71b and 81b and belt members 71c and 81c, respectively, constituting the first and second plane motion transfers 71 and 81 is identical to that of the transfer guide frames 21 and 51, the plurality of transfer rollers 22 and 52 and the belt members 23 and 53 as shown in Fig. 4, so a detailed description thereof will be omitted.

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To move in plane motion the first and second plane motion transfers 71 and 81 each provided with the transfer guide frame 71a and 81a, the plurality of transfer rollers 71b and 81b and the belt member 71c and 81c, the first plane driving device 72 and the second plane driving device 82 are installed on the bottom of the first plane motion transfer 71 and the second plane motion transfer ~~72~~ 81. Here, the first and second plane driving devices 72 and 82 each is constructed as a plane motor for moving the first and second plane motion transfers 71 and 81 in plane motion.

Please replace the paragraph starting on page 20, line 12 and ending on page 20, line 25 with the following paragraph:

A step of carrying the printed circuit board moved in plane motion in a predetermined direction and loaded on the first plane motion transfer unit 70 to the first conveyer unit 30 or the second ~~plane motion transfer~~ conveyor unit 40 by control of the controller 61 in turns at a predetermined time interval is performed. Here, the first plane motion transfer unit 70 is moved to one end of the first conveyer unit 30 by control of the controller 61 to supply the printed circuit board to the first conveyer unit 30, and after a predetermined time, is moved to one end of the second conveyer unit 40 to supply the printed circuit board to the second conveyer unit 40. In addition, the printed circuit board can be supplied in the reverse order.